Received: 15 May 2018 | Revised: 17 December 2018 | Accepted: 12 February 2019

DOI: 10.1111/jmp.12405

WILEY

CASE REPORT

Complete rectal prolapse in wild anubis baboons (*Papio anubis*)

Haruka Taniguchi[1] | Lynne A. Isbell[1,2] | Laura R. Bidner[1,2] | Akiko Matsumoto-Oda[1,3]

[1]Mpala Research Centre, Nanyuki, Kenya

[2]Department of Anthropology, University of California, Davis, Davis, California

[3]Graduate School of Tourism Sciences, University of the Ryukyus, Nishihara, Okinawa, Japan

Correspondence
Akiko Matsumoto-Oda, Graduate School of Tourism Sciences, University of the Ryukyus, Nishihara, Okinawa, Japan.
Email: a_matsu@tm.u-ryukyu.ac.jp

Funding information
JSPS KAKENHI, Grant/Award Number: JP16H05776 to AMO; UC Davis Faculty Research Grants, Grant/Award Number: to LAI; Leakey Foundation, Grant/Award Number: to LAI; National Science Foundation, Grant/Award Number: BCS1266389 to LAI and BCS 99-03949 to LAI; Wenner-Gren Foundation, Grant/Award Number: Grant Number 8386 to LRB

Abstract

This report describes two cases of rectal prolapse in wild anubis baboons (*Papio anubis*), with one spontaneous resolution. Both occurred after individuals consumed low-water, high-fibre dried maize during provisioning prior to capture, while one also experienced distress during capture.

KEYWORDS
anorectal disease, food type, primate capture

1 | INTRODUCTION

Rectal prolapse is classified as either incomplete, which involves only the rectal mucosa, or complete, in which the full thickness of the rectum prolapses through the anus.[1] Rectal prolapse can result from various factors, including straining related to cystitis, chronic coughing, parasites and defecation disorders due to environmental or social distress.[1,2]

Rectal prolapse has been observed more often in captive primates[3-7] than in wild primates. Four wild chacma baboons (*P. ursinus*) that had fed extensively on sour fig/ice plant (*Carpobrotus* spp.) and three wild mountain gorillas (*Gorilla gorilla*) that fed on Malabar spinach (*Basella alba*) developed rectal prolapses. In all but one (a gorilla), they spontaneously resolved within 1-2 days (L. Barrett and S.P. Henzi, pers. comm.).[2] Here, we report rectal prolapses in two wild anubis baboons (*P. anubis*) related to provisioning with maize, and capture.

2 | CASE REPORTS

2.1 | Case 1

Between 20 October 2016 and 5 November 2016, at the end of the dry season (rainfall: 6.8 mm in Oct, 51.8 mm in Nov), baboons at Mpala Research Centre, Kenya (0.17°N, 36.53°E) were provisioned with dried maize in preparation for capturing. A habituated juvenile female (named "***to***") in AI group was not captured although she did have access to the maize.

On 7 November 2016, at 09:50 AM, we observed ***to*** with no symptoms of rectal prolapse (Figure 1A). By 10:36 AM ***to*** had a complete rectal prolapse, with pink surface exposed (Figure 1B). At 05:03 PM, ***to*** was observed lying on her ventrum on a rock, with the rectal prolapse slightly desiccated (Figure 1C,D). At that time, the prolapse was approximately 6-7 cm long and 3-4 cm wide. At 08:28 AM the next day, ***to*** was observed without the rectal prolapse. It was not observed to recur during the subsequent 8-month research period.

FIGURE 1 Complete rectal prolapse in a wild juvenile female baboon. Before rectal prolapse: (A) 7 November 2016, at 09:50 AM; during rectal prolapse: (B) at 10:45 AM, and (C) and (D) at 05:03 PM

2.2 | Case 2

Baboons were also provisioned with dried maize in preparation for capturing between 28 December 2013 and 23 January 2014, during the dry season (rainfall: 17.5 mm in those 2 months). On 15 January 2014, we captured an unhabituated adult female (named '***TH***') in LI group using a cage trap. ***TH*** became visibly agitated and avoided us as attempts to immobilise her with a syringe failed. After we switched to a blowpipe, ***TH*** was successfully immobilised and then we detected the rectal prolapse. ***TH***'s rectum was pushed back in place, and we released her when she was fully awake. We did not observe ***TH*** after that but monitored ***TH*** remotely for 6 months by GPS.[8]

3 | DISCUSSION

In captive primates, rectal prolapse occurs at various ages[3-5,7], whereas in wild primates, 9 of 10 have occurred in juveniles (L. Barrett and S.P. Henzi, pers. comm.),[2] including our Case 1. Our Case 2 was an adult but, unlike the others, ***TH*** experienced distress during capture and immobilisation. In wild primates, rectal prolapse also appears to be associated with intensive feeding on one particular food item (L. Barrett and S.P. Henzi, pers. comm.).[2] Both of our Cases had fed extensively on dried maize. Dried maize has low-water and high-fibre content,[9] which can lead to constipation and perhaps then to rectal prolapse.

Case 1 showed that terrestrial, quadrupedal primates with rectal prolapse can move long distances, as ***to*** walked to the sleeping site (2.5 km) even with a rectal prolapse. However, the fact that ***to*** was not sitting but lying ventrally on the rock (Figure 1D) suggested that she found it difficult to sit. Prolonged rectal prolapse might interfere with various activities, such as resting, feeding or grooming because sitting is a frequent posture, accounting for an average of nearly 50% of all activities.[10]

This report suggests that foods with low-water and high-fibre content, either alone or with induced distress, can cause rectal prolapse. This may be more problematic in the hotter, dry season when water for drinking is less available and perspiration increases.[11] Further studies will be necessary to elucidate the relationship between types of food or different seasons and the occurrence of rectal prolapse. Until then, we suggest that capture protocols take into consideration seasonality and foods used in provisioning to reduce the potential for rectal prolapse.

ACKNOWLEDGMENTS

We thank Kenya's National Commission for Science, Technology and Innovation and the Kenya Wildlife Service for permission to conduct research including capture with ethical review (No. NCST/RRI/12/1/BS/240 to AMO and P/15/5820/4650 to LAI). We also thank Margaret Kinnaird, Dino Martins, Mathew Mutinda, George Omondi, Andrea Surmat, Peter Lokeny, Wilson Longor and Eric Van Cleave for field assistance. This work was supported by JSPS KAKENHI Grant

Number JP16H05776 to AMO, the Wenner-Gren Foundation (grant 8386) to LRB, and the National Science Foundation (BCS 99-03949 and BCS 1266389), L.S.B. Leakey Foundation and UC Davis Faculty Research Grants to LAI.

ORCID

Haruka Taniguchi https://orcid.org/0000-0002-1603-9482
Akiko Matsumoto-Oda https://orcid.org/0000-0002-8076-5534

REFERENCES

1. Ducharme NG, Desrochers A, Fubini SL, et al. Surgery of the bovine digestive system. In: Fubini SL, Ducharme N, eds. *Farm Animal Surgery-E-Book*, 2nd edn. St. Louis, MO: Elsevier Health Sciences; 2016:223-343.
2. Kalema-Zikusoka G, Lowenstine L. Rectal prolapse in a free-ranging mountain gorilla (*Gorilla beringei beringei*): clinical presentation and surgical management. *J Zoo Wildl Med*. 2001;32:509-513.
3. Goodall SV, Chinnadurai SK, Kwan T, Aitken-Palmer C. Surgical treatment of recurrent rectal prolapse in an adult female black-crested mangabey (*Lophocebus aterrimus*) by colopexy. *Comp Med*. 2018;68:80-83.
4. Dick EJ, Owston MA, David JM, Sharp RM, Rouse S, Hubbard GB. Mortality in captive baboons (*Papio* spp.): a-23-year study. *J Med Primatol*. 2014;43:169-196.
5. Hamlin HJ, Lawrence JM. Giardiasis in laboratory-housed squirrel monkeys – a retrospective study. *Lab Anim Sci*. 1994;44:235-239.
6. Tribe GW. Rectal prolapse in a *Macaca mulatta* monkey. *Vet Rec*. 1965;77:551.
7. Lee S-R, Lee Y-H, Kim K-M, et al. Rectal prolapse associated with recurrent diarrhea in a laboratory cynomolgus monkey (*Macaca fascicularis*). *Lab Anim Res*. 2010;26:429-432.
8. Isbell LA, Bidner LR, Van Cleave EK, Matsumoto-Oda A, Crofoot MC. GPS-identified vulnerabilities of savannah-woodland primates to leopard predation and their implications for early hominins. *J Hum Evol*. 2018;118:1-13.
9. Ministry of Education, Culture, Sports, Science and Technology of Japan. Standard tables of food composition on Japan–2015, 7th edn. http://www.mext.go.jp/en/policy/science_technology/policy/title01/detail01/1374030.htm. Accessed November 25, 2018.
10. Rose MD. Positional behaviour of olive baboons (*Papio anubis*) and its relationship to maintenance and social activities. *Primates*. 1977;18:59-116.
11. Best A, Kamilar JM. The evolution of eccrine sweat glands in human and nonhuman primates. *J Hum Evol*. 2018;117:33-43.

How to cite this article: Taniguchi H, Isbell LA, Bidner LR, Matsumoto-Oda A. Complete rectal prolapse in wild anubis baboons (*Papio anubis*). *J Med Primatol*. 2019;48:179–181. https://doi.org/10.1111/jmp.12405